

Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the above-identified application:

Listing of Claims

Claim 1 (Withdrawn): A system for issuing an authentication certificate used in personal authentication, comprising:

reaction means for reacting a DNA array in which a plurality of DNA probes corresponding to plural kinds of genes are arranged in a predetermined order, with the gene obtained from a given person;

storage means for registering the hybridization pattern obtained by said reaction means;

issuing means for issuing an authentication certificate for certifying the person; and

controlling means for executing a process comprising the steps of:

(i) making said reaction means react the DNA array with a gene obtained from the given person to form a hybridization pattern; and

(ii) making said issuing means issue an authentication certificate by attaching the reacted DNA array obtained in the step (i) to a base of the authentication certificate;

wherein a plurality of different DNA probes are arranged on the DNA array so that the DNA array presents a different hybridization pattern depending on a different personal DNA.

Claims 2-6. (Canceled)

Claim 7 (Withdrawn): The system according to claim 1, wherein the DNA probes of the DNA array comprise gene probes associated with major histocompatibility complex antigens.

Claim 8 (Withdrawn): The system according to claim 1, wherein the DNA probes of the DNA array comprise gene probes associated with major histocompatibility complex antigens and single nucleotide polymorphisms.

Claim 9 (Withdrawn): The system according to claim 1, further comprising extraction means for extracting DNA from a blood sample, and providing the DNA to said reaction means.

Claim 10 (Withdrawn): The system according to claim 1, wherein a substrate on which the base and the DNA array are integrally formed is used.

Claim 11 (Withdrawn): A method for issuing an authentication certificate used in personal authentication, comprising the steps of:

(i) reacting a DNA array in which a plurality of DNA probes corresponding to plural kinds of genes are arranged in a predetermined order, with a gene obtained from a given person to form a hybridization pattern;

(ii) issuing an authentication certificate for certifying the person by attaching the reacted DNA array obtained in the step (i) to a base of the authentication certificate;

wherein a plurality of different DNA probes are arranged on the DNA array so that the DNA array presents a different hybridization pattern depending on a different personal DNA.

Claims 12-16 (Canceled).

Claim 17 (Withdrawn): The method according to claim 11, wherein the DNA probes of the DNA array comprise gene probes associated with major histocompatibility complex antigens.

Claim 18 (Withdrawn): The method according to claim 11, wherein the DNA probes of the DNA array comprise gene probes associated with major histocompatibility complex antigens and single nucleotide polymorphisms.

Claim 19 (Withdrawn): The method according to claim 11, further comprising the extraction step of extracting DNA from a blood sample, and providing the DNA to the reaction step.

Claim 20 (Withdrawn): The method according to claim 11, wherein a substrate on which the base and the DNA array are integrally formed is used.

Claim 21 (Withdrawn): An apparatus for issuing an authentication certificate used in personal authentication, comprising:

reaction means for reacting a DNA array in which a plurality of DNA probes corresponding to plural kinds of genes are arranged in a predetermined order, with a gene obtained from a given person to form a hybridization pattern;

storage means for registering the hybridization pattern formed by said reaction means; and

issuing means for issuing an authentication certificate for certifying the person by attaching the reacted DNA array obtained by said reaction means to a base of the authentication certificate,

wherein a plurality of different DNA probes are arranged on the DNA array so that the DNA array presents a different hybridization pattern depending on a different personal DNA.

Claims 22-23 (Canceled)

Claim 24 (Withdrawn): The apparatus according to claim 21, further comprising extraction means for extracting DNA from a blood sample, and providing the DNA to said reaction means.

Claim 25 (Currently Amended): An authentication system for personal authentication which is used together with an authentication certificate on which a DNA array reacted with a gene obtained from a given person is attached, the DNA array carrying a plurality of spots of DNA probes corresponding to plural kinds of genes in a predetermined order, the system comprising:

storage means for storing registration information which includes layout information representing a hybridized pattern of reacted DNA array;

acquisition means for reading the hybridization pattern of a reacted DNA array attached on a authentication certificate and acquiring layout information from the hybridization pattern; and

controlling means for executing a process comprising the steps of:

(i) generating authentication information on the basis of the layout information acquired by said acquisition means; and

(ii) collating the authentication information with the registration information as a reference stored in said storage means, and making authentication,

wherein a plurality of spots of different DNA probes are arranged on the DNA array so that the DNA array presents a different hybridization pattern depending on a different personal DNA, and each of the plurality of different DNA probes indicative of a person's MHC genes or a person's SNPs by whether or not each of the plurality of different DNA probes is reactive or non-reactive to that person's DNA each of the spots indicates presence or absence of a target gene arrangement by presence or absence of reaction and the hybridization pattern is a two-dimensional binary pattern indicated by the presence or absence of the reaction at the spots.

Claim 26 (Canceled):

Claim 27 (Original): The system according to claim 25, wherein the layout information includes data that represent positions of the hybridized probes on the DNA array by coordinate values.

Claim 28 (Previously presented): The system according to claim 25, wherein said acquisition means comprises a scanner for reading the hybridized pattern of the reacted DNA array as an image, and conversion means for detecting probes after reaction from the read image, and converting the detected probes into the layout information.

Claims 29-30 (Canceled).

Claim 31 (Original): The system according to claim 25, further comprising registration means for storing the authentication information generated by said generation means in said storage means as the registration information.

Claim 32 (Cancelled).

Claim 33 (Previously presented): The system according to claim 25, wherein the DNA array comprises the DNA probes associated with major histocompatibility complex antigens and single nucleotide polymorphisms.

Claim 34 (Previously presented): The system according to claim 25, wherein the DNA array is formed by arranging the plurality of different DNA probes in row and column directions, and

the layout information expresses the positions of the hybridized probes on the DNA array using row and column addresses.

Claim 35 (Original): The system according to claim 25, wherein the authentication information and registration information contain person specifying information for specifying a given person, and

said authentication means makes authentication by searching said storage means for registration information which contains the same person specifying information as the person specifying information contained in the authentication information generated by said generation means, and collating the layout information of the generated authentication information and the registration information found by search.

Claim 36 (Original): The system according to claim 25, wherein an apparatus having said acquisition means and said generation means, and an apparatus having said storage means and said authentication means are connected via the Internet, and the authentication information is sent via the Internet.

Claim 37 (Withdrawn): An apparatus for sending an authentication request to an external apparatus, the apparatus being used with an authentication certificate on which a

reacted DNA array obtained by reacting a DNA array with a gene obtained from a given person is attached, in which a plurality of DNA probes corresponding to plural kinds of genes are arranged in a predetermined order, the apparatus comprising:

acquisition means for reading the hybridization pattern of a reacted DNA array attached on a authentication certificate and acquiring layout information from the hybridized pattern; and

controlling means for executing a process comprising the steps of:

(i) generating authentication information on the basis of the layout information acquired by said acquisition means;

(ii) sending the authentication information generated in the step (1) to the external apparatus, and requesting user registration; and

(iii) sending the authentication information to the external apparatus, and requesting authentication,

wherein a plurality of different DNA probes are arranged on the DNA array so that the DNA array presents a different hybridization pattern depending on a different personal DNA.

Claim 38 (Canceled).

Claim 39 (Currently Amended): An authentication method for personal authentication comprising the steps of:

(i) providing a storage means which stores registration information including layout information representing a hybridization pattern formed on a reacted DNA array obtained by reacting a DNA array in which a plurality of spots of different DNA probes

corresponding to plural kinds of genes are arranged in a predetermined order, with a gene obtained from a given person;

(ii) acquiring layout information from an authentication certificate by reading a hybridization pattern of a reacted DNA array attached on the authentication certificate;

(iii) generating authentication information on the basis of the layout information acquired in the step (ii); and

(iv) collating the authentication information generated in the step (iii) with the registration information stored in said storage means, and making authentication,

wherein a plurality of spots of different DNA probes are arranged on the DNA array so that the DNA array presents a different hybridization pattern depending on a different personal DNA, ~~and each of the plurality of different DNA probes indicative of a person's MHC genes or a person's SNPs by whether or not each of the plurality of different DNA probes is reactive or non reactive to that person's DNA~~ each of the spots indicates presence or absence of a target gene arrangement by presence or absence of reaction and the hybridization pattern is a two-dimensional binary pattern indicated by the presence or absence of the reaction at the spots.

Claim 40 (Canceled)

Claim 41 (Original): The method according to claim 39, wherein the layout information includes data that represent positions of the hybridized probes on the DNA array by coordinate values.

Claim 42 (Previously presented): The method according to claim 39, wherein

the acquisition step comprises the conversion step of detecting probes after reaction from an image read by a scanner for reading the reaction pattern of the reacted DNA array as an image, and converting the detected probes into the layout information.

Claims 43-44 (Canceled)

Claim 45 (Original): The method according to claim 39, further comprising the registration step of storing the authentication information generated in the generation step in said storage means as the registration information.

Claim 46 (Cancelled).

Claim 47 (Previously presented): The method according to claim 39, wherein the DNA array comprises the DNA probes associated with major histocompatibility complex antigens and single nucleotide polymorphisms.

Claim 48 (Previously presented): The method according to claim 39, wherein the DNA array is formed by arranging the plurality of different probes in row and column directions, and

the layout information expresses the positions of the hybridized probes on the DNA array using row and column addresses.

Claim 49 (Original): The method according to claim 39, wherein the authentication information and registration information contain person specifying information for specifying given person, and

the authentication step includes the step of making authentication by searching said storage means for registration information which contains the same person specifying information as the person specifying information contained in the authentication information

generated in the generation step, and collating the layout information of the generated authentication information and the registration information found by search.

Claim 50 (Original): The method according to claim 39, wherein an apparatus having the acquisition step and the generation step, and an apparatus having said storage means and the authentication step are connected via the Internet, and the authentication is sent via the Internet.

Claim 51 (Withdrawn): A method for sending an authentication request to an external apparatus, comprising:

the acquisition step of acquiring layout information that represents a hybridization pattern formed on a reacted DNA array obtained by reacting a DNA array in which a plurality of DNA probes corresponding to plural kinds of genes are arranged in a predetermined order, with a gene obtained from a given person, by reading a reacted DNA array attached on an authentication certificate;

the generation step of generating authentication information on the basis of the layout information acquired in the acquisition step;

the registration request step of sending the authentication information to the external apparatus to request user registration; and

the authentication request step of sending the authentication information to the external apparatus to request authentication,

wherein a plurality of different DNA probes are arranged on the DNA array so that the DNA array presents a different hybridization pattern depending on a different personal DNA.

Claim 52 (Canceled)

Claim 53 (Withdrawn): An authentication certificate used to authenticate a given person, comprising:

a base; and

a reacted DNA array attached on said base,

wherein a plurality of different DNA probes are arranged on the DNA array so that the DNA array presents a different hybridization pattern depending on a different personal DNA.

Claims 54-56 (Canceled).

Claim 57 (Withdrawn): A computer readable medium which stores a control program for making a computer execute an authentication process for personal authentication using storage means for storing registration information which includes layout information that represents a hybridization pattern formed on a reacted DNA array obtained by reacting a DNA array in which a plurality of DNA probes corresponding to plural kinds of genes are arranged in a predetermined order, with a gene obtained from a given person, said control program comprising:

a code of the acquisition step of acquiring the layout information from a reacted DNA array attached on an authentication certificate;

a code of the generation step of generating authentication information on the basis of the layout information acquired in the acquisition step; and

a code of the authentication step of making authentication by collating the authentication information generated in the generation step with the registration information stored in said storage means,

wherein a plurality of different DNA probes are arranged on the DNA array so that the DNA array presents a different hybridization pattern depending on a different personal DNA.

Claim 58 (Withdrawn): A computer readable medium which stores a control program for making a computer execute an authentication process for making authentication using an authentication certificate attached with a hybridization pattern formed on a reacted DNA array obtained by reacting a DNA array in which a plurality of DNA probes corresponding to plural kinds of genes are arranged in predetermined order, with a gene obtained from a given person, said control program comprising:

a code of the acquisition step of acquiring layout information that represents the layout pattern of the hybridized probes by reading a reacted DNA array attached on the authentication certificate;

a code of the generation step of generating authentication information on the basis of the layout information acquired in the acquisition step;

a code of the registration request step of sending the authentication information to the external apparatus to request user registration; and

a code of the authentication request step of sending the authentication information to the external apparatus to request authentication,

wherein a plurality of different DNA probes are arranged on the DNA array so that the DNA array presents a different hybridization pattern depending on a different personal DNA.

Claim 59 (Canceled)

Claim 60 (Withdrawn): A system for issuing an authentication certificate used in personal authentication, comprising:

reaction means for reacting a DNA array with a gene obtained from a given person, the DNA array being selected from plural kinds of DNA arrays each of which has a plurality of DNA probes corresponding to plural kinds of genes arranged in a predetermined order, wherein the order of the DNA probes in the plural kinds of DNA arrays are different from each other;

registering means for registering an order of DNA probes of the selected DNA array; and

issuing means for issuing an authentication certificate for certifying the person by attaching a reacted DNA array obtained by said reaction means on the authentication certificate,

wherein a plurality of different DNA probes are arranged on the DNA array so that the DNA array presents a different hybridization pattern depending on a different personal DNA.

Claim 61 (Withdrawn): An authentication method comprising the steps of:

(i) reacting a DNA array with a gene obtained from a given person to form a first hybridization pattern, the DNA array being selected from plural kinds of DNA arrays

each of which has a plurality of different DNA probes corresponding to plural kinds of genes arranged in a predetermined order, wherein the order of the DNA probes in the plural kinds of DNA arrays are different from each other;

(ii) registering type information regarding the order of the DNA probes of the DNA array selected in the step (i) in association with the first hybridization pattern;

(iii) issuing an authentication certificate carrying a hybridization pattern formed on a reacted DNA array obtained by the step (i) to the given person;

(iv) forming a second hybridization pattern, when a person holding the authentication certificate issued in the step (iii), needs to be identified as a true holder of the authentication certificate, the step (iv) comprising the sub-steps of:

(iv-1) regenerating a new DNA array which is identical to the DNA array selected in the step (i) by using the type information registered in the step (ii); and

(iv-2) reacting the new DNA array with a gene obtained from the suspected person to form a second hybridization pattern; and

(v) comparing the first hybridization pattern on the authentication certificate and the second hybridization pattern,

wherein a plurality of different DNA probes are arranged on the DNA array so that the DNA array presents a different hybridization pattern depending on a different personal DNA.

Claim 62 (Withdrawn) The method according to claim 11, wherein the plurality of different DNA probes are regularly arranged in a matrix form, each of the plurality of different DNA probes indicative of a person's MHC genes or a person's SNPs by

whether or not each of the plurality of different DNA probes is reactive or non reactive to that person's DNA.

Claim 63 (Withdrawn) The authentication certificate according to claim 53, wherein the plurality of different DNA probes are regularly arranged in a matrix form, each of the plurality of different DNA probes indicative of a person's MHC genes or a person's SNPs by whether or not each of the plurality of different DNA probes is reactive or non reactive to that person's DNA.

Claim 64 (Withdrawn) A DNA array for authentication, a plurality of different DNA probes are arranged on the DNA array, and the plurality of different DNA probes on the DNA array presents a different hybridization pattern depending on a different personal data.

Claim 65 (Withdrawn) The DNA array according to claim 64, wherein the plurality of different DNA probes are regularly arranged in a matrix form, each of the plurality of different DNA probes indicative of a person's MHC genes or a person's SNPs by whether or not each of the plurality of different DNA probes is reactive or non reactive to that person's DNA.

Claim 66 (Withdrawn) The DNA array according to claim 64, wherein the hybridization pattern is a pattern of reaction on the DNA array, which is formed by existence or nonexistence of reaction between each of the plurality of different probes and the person's DNA.